

Applicant : Clair Hartmann-Thompson
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REMARKS

This response does not include any amendments. Accordingly, claims 2, 3 and 5-10 remain pending and under consideration in the above-identified application.

Prior Art Rejection

Claims 5 and 6 stand rejected under 35 U.S.C §103(a) as being unpatentable over U.S. Patent No. 7,501,091 (hereinafter referred to as “Munoz”) in view of Zheng, “X-Ray Characterizations of Polyethylene Polyhedral Oligomeric Silsesquioxane Copolymers,” (2001) (hereinafter referred to as “Zheng”).

In the rejection, Munoz is relied upon for teaching “a sensor containing a layer of conductive modified particles which forms an electrical pathway or electrical circuit between two electrodes which are connected to an electrical measuring apparatus. . . .” It is admitted that Munoz “does not teach polyhedral oligomeric silsesquioxane as the functional group.”

In the rejection, Zheng is relied upon for teaching “the use of polyhedral oligomeric silsesquioxane (POSS) nanoparticles polymerized with copolymers (polymer matrix, polysiloxane) to create new stable polymer.”

The rationale for the rejection is that it would have been obvious to a person having ordinary skill in the art at the time of the invention “to modify Munoz to employ a POSS functional group on the carbon black to provide for a more stable polymeric matrix.”

Some clarification or amplification of the alleged benefit is appropriate. Zheng does not teach that copolymers of POSS are more stable generally. Rather, Zheng teaches that POSS-ethylene copolymers exhibit better dimensional stability, “with retention of shape well above the melting temperature of polyethylene” (see page 2378, right column, lines 26-28). There is no indication in either Zheng or Munoz that such dimensional stability or shape-retention is relevant to the design and function of an analyte sensor.

Accordingly, the applied prior art does not provide a reason from which the person having ordinary skill in the art could expect that applying the technology of Zheng to the sensors of Munoz will provide a beneficial result. The person having ordinary skill in the art would not expect or predict that the proposed modification of the Munoz sensors would be successful.

Additionally, there are numerous defects in the rationale for the rejection.

First, the POSS particles of the claimed invention are not functional groups. Rather, they are solid particles that serve as platforms for analyte-detecting functionalities, and which are physically dispersed in a polymer matrix. This is substantially different from the use of POSS as a comonomer with ethylene as disclosed by Zheng.

Second, the prior art does not teach, suggest, or provide a reason or expectation of successfully “employing a POSS functional group on the carbon black.” Munoz teaches the use of carbon black as an electrically conductive filler that is physically dispersed in a matrix. Zheng teaches the use of POSS as a monomer for synthesis of POSS-ethylene copolymer. The successful use of POSS as a comonomer with ethylene does not suggest its use as a “POSS functional group on carbon black.”

Third, addition of the POSS-ethylene copolymer of Zheng into the sensors of Munoz would not constitute dispersion of POSS into a polymer matrix. A dispersion is a system in which one material in a particle form is physically spread throughout a continuous phase or matrix. The POSS-ethylene copolymers of Zheng do not constitute dispersions in which POSS particles are spread throughout a polymer matrix.

Fourth, the Zheng copolymer is not comprised of POSS particles having “functional groups capable of interacting with the analyte,” as required by the claims under consideration. Zheng only teaches functionalizing the POSS with organic groups that facilitate copolymerization with ethylene, and other organic groups that promote solubility in conventional solvents (see page 2375, left column, first paragraph of the “Introduction”).

The proposed modification set forth in the rejection does not contemplate or result in the claimed invention in which modified POSS having functional groups capable of interacting with an analyte are dispersed in a continuous polymer matrix. The invention as claimed “allows the polymer matrix to be selected based primarily on its diffusion properties, strength, stability and other physical characteristics, independent of limitations and compromises that arise when attempting to synthesize polymers having specific types of sensory groups chemically bound to the polymer,” such that “a single polymer matrix or relatively few different polymer matrices may be used to prepare a diverse sensor array using different fillers,” thereby providing “the ability to modify a solid particulate to produce a variety of different types of sensory filler materials [which] allow certain types of sensors to be fabricated more easily and at a lower cost.”

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These advantages (set forth at page 5, lines 6-13 of the specification) cannot be achieved by incorporating the POSS copolymers of Zheng into the sensors of Munoz. There is an important difference, in terms of both structure and results, between employing the POSS-ethylene copolymers of Zheng into the sensors of Munoz and physically dispersing POSS having analyte-detecting functionalities in a polymer matrix. One provides the benefits of the invention, the other clearly does not.

Adding POSS to the Munoz sensors as required in the rejection would actually be contrary to the teachings of Munoz, which requires the addition of an electrically-conductive material. POSS is not an electrically-conductive material.

Based on the rejection, there appears to be considerable confusion regarding the teachings of the prior art and the subject matter of the claimed invention. In particular, there appears to be a mistaken belief that the POSS particles can act as functional groups bonded to the carbon particles of Munoz. There also appears to be considerable confusion regarding the differences between POSS particles dispersed in a polymer matrix and the use of POSS as comonomer. The Examiner is invited to contact the undersigned attorney if further clarification is desired.

Allowable Subject Matter

Applicants appreciate and acknowledge that claims 2, 3 and 7-10 are allowed.

CONCLUSION

In view of the above remarks, it is submitted that the rejection of claims 5 and 6 under 35 U.S.C. §103(a) based on Munoz in view of Zheng was made in error and should be withdrawn.

Respectfully submitted,

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Date

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